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The Fertilizer Control

FOR 1897.

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THE NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION,
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RALEIGH, N. C.

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The Station is glad to receive any inquiries on agricultural subjects. ***Address all communications to the Agricultural Experiment Station, and not to individuals.*** They will be referred to the members of the Station staff most competent to answer them.

THE FERTILIZER CONTROL FOR 1897.

W. A. WITHERS, CHEMIST AND ACTING DIRECTOR.

INTRODUCTION.

It was the custom of the Experiment Station for many years, to publish under its own auspices, the results of the analyses by members of its staff, of the samples of fertilizers taken by the different Inspectors under the supervision of the Commissioner of Agriculture, from lots on sale in the State.

When the existing agreement was entered into between the Board of Commissioners of the Department of Agriculture and the Board of Control of the Experiment Station, it was made a condition that the Commissioner of Agriculture should have the exclusive publication of the results of the analyses. In consequence the individual results of the analyses are not included in this bulletin which it is deemed proper should be published for the information of those interested in the fertilizer industry, either as manufacturers, agents or consumers.

The analytical work was performed from January 1st to July 1st by Messrs Kilgore, Allen, Miller and Asbury, under the direction of Dr. Battle and for the remainder of the year, by Messrs Williams, Miller, Harris and Blair, under the direction of the author.

Acknowledgment is also made to Commissioner Smith and Secretary Ramsey of the Department of Agriculture for valuable information furnished by them.

PUBLICATIONS DURING 1897, CONTAINING FERTILIZER ANALYSES.

The analyses were published as follows :

Special bulletins of the Experiment Station, No. 40, February 20; No. 41, March 6; No. 42, March 20; No. 43, April 3; No. 44, April 17; No. 45, May 1; No. 46, May 22; No. 47, June 26, 1897.

The Bulletin of the North Carolina Department of Agriculture March, April, June and July, 1897.

The Bulletin of the Agricultural Experiment Station of North Carolina, published under the supervision of the Department of Agriculture for September, October, November and December, 1897.

RELATION OF THE STATION TO THE FERTILIZER CONTROL.

According to the terms of the contract previously referred to between the Department of Agriculture and the Experiment Sta-

tion, the Experiment Station has no responsibility for any part of the Fertilizer Control work, except as to the correctness of the analyses of the samples furnished by the Commissioner. These samples are received by the Experiment Station in glass bottles bearing the private seal of the inspector and having a number by which they are identified. The name of the brand, manufacturer, place at which sample was taken, etc., are withheld from the Experiment Station until the completion of the analysis and the filing of a report of the same with the Commissioner of Agriculture, who then publishes the information in full.

The collection of the samples and the publishing of the results is entirely in the hands of the Commissioner, who is the agent of the Department of Agriculture.

INCREASE OF NUMBER OF BRANDS AND THE DIFFICULTY IN A PROPER CONTROL.

During the year 1890, the last year during which we had a tax for each brand, there were eighty-four brands of commercial fertilizers licensed to be sold in North Carolina. As there was a tax for each brand of $500 per annum, it was always true that a considerable quantity of each brand of fertilizer was sold, or it was hoped by each manufacturer that such would be the case. With a small number of brands, and with large quantities of each brand, it was not difficult to collect samples of each, and to complete analyses of these with promptness. During the year 1897 there were 673 brands registered, and the Commissioner of Agriculture furnished for analysis samples of 336 brands, leaving 337 of which no analyses were made. During the year 1896, there were 344 brands, out of a total of 666 registered, which were not analyzed, and during the year 1895 there were 266 brands, out of a total of 541 registered, which were not analyzed.

For each of the past three years, therefore, samples of only about fifty per cent. of the licensed brands have been analyzed.

It is impossible for us to say whether the brands which were not sampled were actually on sale in the State. As there is no limit to the number of brands, it is quite possible that in order to meet the varied demands which may be made by the possible consumers, many brands are registered of which there is no sale.

FIRMS WHICH REGISTERED BRANDS FOR SALE IN NORTH CAROLINA DURING 1897.

NAME.	ADDRESS.	Superphosphates.	Superphosphates with Potash.	Ammoniated Superphosphates.	Ammoni't'd Superphosphates with Potash.	Miscellaneous.	Total.
Acme Manufacturing Co.	Wilmington, N. C.	1			4	1	6
American Fertilizing Co.	Norfolk, Va.	3	1	1	8	6	19
Armour Packing Co.	Kansas City, Mo.			4	6	3	13
Armour Fertilizing Works.	Chicago, Ill.				9	3	12
Arps, Geo. L. & Co.	Norfolk, Va.				1		1
Ashepoo Phosphate Co	Charleston, S. C.	5	1		5	2	13
Baltimore Guano Co.	Baltimore, Md				2		2
Baltimore Pulverizing Co.	Baltimore, Md				2		2
Baugh & Sons Co.	Baltimore, Philad'a and Norfolk.	1		4	9	6	20
Beam, J. H.	Lattimore, N. C.	1	1		2		4
Bell, Westbrook & Co.	Beaufort, N. C					1	1
Berkeley Phosphate Co	Charleston, S. C.	1	1		1		3
Bonday, Jas., Jr. & Co	Baltimore, Md					4	4
Boykin, Carmer & Co.	Baltimore, Md			1		2	3
Boykin & Stanley	Baltimore, Md			1	2	2	5
Bradley Fertilizer Co.	Boston, Mass.				3		3
Bragaw, Wm. & Co.	Washington, N. C.					1	1
Branch, A. P.	Wilson, N. C.				1		1
Buxton & Baughm	Rich Square, N. C.				1		1
Calder Bros	Wilmington, N. C.					1	1
Caraleigh Phosphate and Fertilizer Works.	Raleigh, N. C.	3	1		6	1	11
Charlotte Oil and Fert. Co.	Charlotte, N. C.	3	2		9		14
Chemical Co. of Canton	Baltimore, Md	1	1		5	4	11
Chicora Fertilizer Co	Charleston, S. C.	8	5		5	1	19
Clement, Carrington & Co.	Lynchburg, Va.				3		3
Columbia Guano Co.	Norfolk, Va.	3	1		5	1	10
Darlington Phosphate Co	Darlington, S. C.	4	2		3	3	12
Detrick Fert. and Chem. Co.	Baltimore, Md	2		1			3
Detrick, L. F.	Baltimore, Md				1		1
Dey Bros.	Beaufort, N. C.					1	1
Edisto Phosphate Co	Charleston, S. C	2	1		4	1	8
Etiwan Phosphate Co.	Charleston, S. C.	4	2		8	1	15
Fowler, Cowell & Co	Bayboro, N. C.				3		3
Garrell, J. F. & Co	Wilmington, N. C.	1		1	11	1	14
Goldsboro Oil Co.	Goldsboro, N. C.				3		3
Great Eastern Fertilizer Co.	New York, N. Y.				4		4
Greenville Fertilizer Co	Greenville, S. C.	1	1		2		4
Griffith & Boyd	Baltimore, Md				3	1	4
Harrell, S. B. & Co.	Norfolk, Va				1		1
Hill, Jno. R.	South Boston, Va.				2		2
Hine, E. J. & Sons	Salem, N. C					1	1
Holmes & Dawson	Norfolk, Va.				2		2
Hubbard, M. P. & Co.	Baltimore, Md				1		1
Idol, W. H. & Co	Jamestown, N. C.					1	1
Imperial Co.	Norfolk, Va.	1			6	1	8
Imperial Fertilizer Co.	Charleston, S. C	3	4		5	1	13
Lazaretto Guano Co.	Baltimore, Md	1			12		13
Leak, J. R.	Rich Square, N. C.				1		1

FIRMS WHICH REGISTERED BRANDS IN NORTH CAROLINA—Continued.

NAME.	ADDRESS.	Superphosphates.	Superphosphates with Potash.	Ammoniated Superphosphates.	Ammoni't'd Superphosphates with Potash.	Miscellaneous.	Total.
Lee, A. S. & Son	Richmond, Va	...	2	...	.....	1	3
Lister's Agricult'l Chem. Wk's	Newark, N. J.	...	...	...	2	...	2
McNair, J. F	Wilmington, N. C.	1	..	..	1	...	2
Mapes Formula and Peruvian Guano Co.	New York, N. Y	...	..	...	6	...	6
MacMurphy, W. C. & Co	Charleston, S. C	1	...	...	10	5	16
Marlboro Mill Co	Bennettsville, S. C	...	..	..	.....	1	1
Meadows E. H. & J. A. Co.	Newbern, N. C	1	1	1	7	1	11
Montgomery & Harrell	Norfolk, Va.	...	...	...	1	..	1
Navassa Guano Co	Wilmington, N. C	4	7	...	19	3	33
Norfolk Fertilizing Co	Norfolk, Va.	...	...	...	5	...	5
N. C. Cotton Oil Co	Raleigh, N. C.	..	..	..	2	...	2
Ober, G. & Sons Co	Baltimore, Md	1	1	...	5	...	7
Patapsco Guano Co	Baltimore, Md	1	...	...	4	1	6
Piedmont-Mt. Airy Guano Co.	Baltimore, Md	2	1	...	10	1	14
Pocomoke Guano Co	Norfolk, Va	1	1	...	7	1	10
Powers, Gibbs & Co.	Wilmington, N. C.	9	5	...	15	4	33
Quinnipiac Co	New York, N Y.	..	...	...	1	...	1
Ragsdale & Smith	Jamestown, N. C.	..	..	...	....	1	1
Raisin Fertilizer Co	Baltimore, Md	1	1	...	4	...	6
Reese, John S. & Co.	Baltimore, Md	..	...	...	1	...	1
Reidsville Fertilizer Co	Reidsville, N. C	1	...	...	5	.	6
Richmond Guano Co	Richmond, Va	3	...	..	3	1	7
Royster, F. S. Guano Co	Tarboro, N. C., and Norfolk, Va.	2	2	...	7	1	12
Royster, F. S. Guano Co	Tarboro, N. C	...	...	...	1	1	2
Slingluff & Co	Baltimore, Md	...	...	...	1	...	1
Standard Fertilizer Mfg. Co.	Charleston, S. C	5	4	...	7	1	17
Stono Phosphate Works	Charleston, S. C	2	1	...	3	1	7
Sweet, R. N	Wilmington, N. C	...	...	...	.....	1	1
Vann, S. C	Franklinton, N. C	...	...	...	1	...	1
Virginia-Carolina Chem. Co	Richmond, Va	28	16	1	82	3	130
Wagener, T. W. & Co	Charleston, S. C	1	1	...	2	1	5
Walker, Joshua.	Baltimore, Md	1	...	...	1	...	2
Wando Phosphate Co	Charleston, S. C	1	1	..	2	1	5
Ward, S. H. & Sons	Jamestown, N. C.	..	...	...	.....	1	1
Warriner, W. H. & Co	Ruffin, N. C.	...	...	...	1	...	1
Weil, H. & Bro's	Goldsboro, N. C.	...	...	...	.....	1	1
Wood, T. W. & Sons	Richmond, Va	...	1	2	4	...	7
Wooldridge, Robt. A. Co	Baltimore, Md	...	...	...	4	...	4
Zell Guano Co	Baltimore, Md	1	...	..	3	...	4
Total		116	69	17	388	83	673

EXTENT AND DISTRIBUTION OF THE TRADE.

The number of brands on sale in the State during the year 1897, was greater than for the year 1896, or for any previous year. The accompanying table shows the number of brands licensed each year for the past twelve years:

	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897
Acid phosphates or simple superphosphates	9	11	10	9	12	16	59	81	86	86	150	107	116
Superphosphates with potash	10	9	8	7	5	4	13	24	22	24	36	68	69
Ammoniated superphosphates with potash	63	66	58	62	62	63	178	232	264	284	330	398	388
Ammoniated superphosphates	....	..	....	....	..	....	15	12	5	12	11	12	17
Kainit	....	....	....	....	...	....	19	25	29	35	38	34	33
Other potash salts and chemicals	...	...	....	....	....	....	3	4	6	6	4	13	10
Animal bone	....	....	....	....	....	...	....	....	3	3	9	16	12
Fish scrap	....	....	....	....	....	....	4	5	4	2	4	8	4
Miscellaneous	3	4	1	1	2	1	4	6	8	10	4	10	24
Totals	85	90	77	79	81	84	295	389	427	462	541	666	673

Attention has been called in previous Reports to the fact that since 1891 we have had a tonnage tax instead of a brand tax. This change in the law has doubtless had the effect of increasing the number of brands very largely. It is to be noted also that there has been an increase in the amount of commercial fertilizers consumed in the State. The Department estimates that during 1897 about 208,000 tons of commercial fertilizers were sold to parties in North Carolina. This estimate is based on the number of tags sold for the year. From this should be subtracted the number of tons corresponding to the unused tags in the hands of manufacturers at the end of the year. To this estimate should be added the number of tags corresponding to the tags purchased in former years and used during 1897—together with the tons illegally sold without tags attached. These three items are probably small—at any rate we have no means of estimating them. The estimate for the year 1896 was 187,000 tons and for 1895 about 111,000 and for 1894 about 131,000 tons.

The number of brands has increased each year over the previous year as follows:

In the year 1892, increase over the previous year..... 101
In the year 1893, increase over the previous year..... 29
In the year 1894, increase over the previous year..... 36

In the year 1895, increase over the previous year..... 80
In the year 1896, increase over the previous year..... 125
In the year 1897, increase over the previous year..... 7

The number of brands accredited to the several States is shown in the following table:

	1885	1886	1887	1888	1889	1890	1892	1893	1894	1895	1896	1897
Massachusetts	3	1	4	7	2	2	3	3	3	3	3	3
Connecticutt	3	1	2	1	1	1	...	....	....	....	....	....
New York	4	3	1	1	2	1	8	10	8	7	9	11
New Jersey	2	3	2	4	4	5	3	7	2	2	1	2
Delaware	4	4	4	3	3	3	...	5	6	2	....	....
Maryland	31	35	29	25	28	25	98	104	93	88	100	94
Pennsylvania	....	1	....	1	....	....	5	12	7	6	....	....
Virginia	18	21	14	12	12	16	96	106	146	189	213	214
North Carolina	9	10	11	13	14	18	78	89	98	137	166	186
South Carolina	11	11	10	13	15	13	85	82	97	96	153	138
Georgia	....	..	....	....	....	....	13	7	1	....	....	....
Missouri	....	....	....	....	....	....	..	....	1	11	11	13
Illinois	....	....	....	....	....	....	....	....	....	....	10	12
Totals	85	90	77	79	81	84	389	427	462	541	666	673

Assuming that there is a close relation between the number of brands manufactured in each State and the number of tons of fertilizers sold by each State, the table furnishes an interesting basis of comparison as to what extent the trade of manufacturing is distributed among the several States.

We have calculated the distribution of the trade for 1897 among the different States upon the basis of tags sold, and have given the calculations upon the different bases for comparison. We insert in the following table, also some other comparative figures for 1897:

State.	No. of Tons Taxed.		No. of Brands.		No. of Firms.		Average No. of Brands Per Firm.	Average No. of Tons Per Firm.	Average No. of Tons Per Brand.
	Number.	Per Cent. of Total.	Number.	Per Cent. of Total.	Number.	Per Cent. of Total.			
Illinois	200.0	.1	12.	1.79	1.	1.15	12.	200.	16.6
Maryland	13482.8	6.4	94.	13.97	20.	23 00	4.7	674.1	143.4
Massachusetts	0.	.....	3.	.44	1.	1.15	3.	.....	.....
Missouri	39.	.....	13.	1.93	1.	1.15	13.	39.	3.
New Jersey	2300.	1.1	2.	.30	1.	1.15	2.	2300.	1150.
New York	50.	....	11,	1.63	3.	3.44	3.6	16.6	4.5
North Carolina.	87824.2	42.2	186.	27.64	30.	34.48	6.2	2927.4	472.1
South Carolina.	12809.	6.2	138.	20.50	14.	16.09	9.9	914.9	92.8
Virginia	91461.2	44.	214.	31.80	16.	18.39	13 3	5716.3	427.3
	208166.2	100.00	673.	100.00	87.	100.00	7.7	2392.7	309.3

VALUATION OF FERTILIZERS AND HOW THEY ARE DETERMINED.

The valuations of the three constituents—available phosphoric acid, ammonia, and potash—are intended to give the market price for cash at the seaboard of the ingredients making up the fertilizer. The cash prices for small lots in bags, free on board cars, are intended. These valuations are made up early in January of each year, to run through the spring and fall seasons. It is expected that there will be variations in the market price of the ingredients during the year, but this variation usually is not great. This is because fertilizing materials are largely contracted for in advance before the opening of the year, and in most cases the ingredients have already been wholly purchased and the fertilizers already manipulated before the beginning of the season.

The valuations of the constituents are fixed by careful examinations of existing trade conditions, the markets at important centres, and from actual quotations given by seaboard manufacturers and dealers upon various ingredients used for manipulating fertilizers. These quotations are for cash in small lots, free on board and bagged.

The relative commercial valuation given to the three valuable ingredients for the year 1897 was—

For available phosphoric acid	4	cents per pound.
For ammonia	12	" " "
For potash	5	" " "

For 1896, the valuations were as follows:

For available phosphoric acid	4½	cents per pound.
For ammonia	13	" " "
For potash	5	" " "

These figures were based, as usual, on the actual retail cash price of the unmixed ingredients at the seaboard in bags.

From the commercial valuation of a fertilizer, a farmer, by using these figures, can see the actual cash worth at the seaboard of the unmixed ingredients used in the fertilizer. In other words, with cash in hand, he could purchase from seaboard manufacturers the materials used to make up the fertilizer at the valuation given per ton. For interior points freight, of course, must be added. In the bulletins showing the analyses of fertilizers a table giving the various frieght rates from seaboard to interior points is always inserted for convenience of buyers.

AVERAGE PERCENTAGE COMPOSITION OF FERTILIZERS ON SALE IN NORTH CAROLINA FOR SEVERAL YEARS.

Kind of Fertilizer.	Year.	Available Phosphoric Acid.		Ammonia.		Potash.		Relative Seaboard Value per ton of unmixed ingredients.	
		By Analysis.	By Guarantee.	By Analysis.	By Guarantee.	By Analysis.	By Guarantee.	By Analysis.	By Guarantee.
Acid phosphates	1890	12.92	12.25	.....	.....	.....	.....	$ 10.34	9.80
	1891	12.21	12.06	.....	.....	.....	.....	9.77	9.65
	1892	12.25	12.01	.....	.....	.....	.....	9.80	9.61
	1893	12.93	12.04	.....	.....	.....	.....	10.34	9.63
	1894	13.73	12.00	.....	.....	.....	.....	10.98	9.60
	1895	13.29	12.21	.....	.....	.....	.....	10.63	9.77
	1896	13.25	11.95	.....	.....	.....	.....	10 60	9.56
	1897	12.96	12,15	.....	.....	.....	.....	10.37	9.72
Acid phosphates with potash.	1890	12.04	10 90	.....	...	1.77	1.42	11.40	10.14
	1891	11 17	10.29	....	....	1.66	1.50	10.60	9.73
	1892	11 22	9.97	.....	....	2.06	1.53	11.04	9.51
	1893	10 38	9.60	.....	.....	1.78	1.40	10.08	9.08
	1894	11.27	9.77	.....	.....	1.77	1.47	10.79	9.29
	1895	10.78	9.32	.....	.....	2.02	1.93	10 64	9.39
	1896	10.47	9 26	.....	....	2.01	1.91	10.39	9.32
	1897	10.58	9.66	....	.....	1.89	1.85	10.35	9.58
Ammoniated superphates with potash	1890	9.11	8.53	2.41	2 29	2.02	1.71	15.09	14.03
	1891	8.11	8.24	2.59	2.51	2.20	1.88	14.90	14.50
	1892	8.70	8.10	2 63	2 46	2 65	2 12	15.92	14.50
	1893	8.37	8.05	2.59	2 47	2.56	1.97	15.47	14.34
	1894	9.04	8.06	2.85	2.76	2.51	2.21	16.58	15.28
	1895	8 84	7.78	3.26	3.05	2.91	2.45	17.81	15.99
	1896	8.99	8.05	2.99	2 76	2.68	2.33	17.05	15.39
	1897	9 01	8.01	2.85	2.56	2.43	2.13	16.47	14.67

The accompanying table shows the number of brands of each of the three different kinds of fertilizers which fell below their guarantee during the year.

Number.	Kind of Fertilizer.	Found Below Guarantee in									
		Available Phosphoric Acid.		Ammonia.		Potash.		Total.		Valuation.	
		No.	Per Ct.	No.	Per Ct.	No.	Per Ct.	No.	Per Ct.	No.	Per. Ct.
75	Acid Phosphates	15	20	...	....	...	..	15	20	15	20
31	Superphosphates with Potash	4	12.9	...	..	9	29	13	41.9	3	9.7
202	Ammoniated Superphosphates with Potash.	10	5	22	10.9	27	13.4	59	29.2	3	1.6
308	Total	29	9 4	22	10.9	36	15.5	87	28.2	21	6 8

Of the acid phosphates, one brand in every five fell below its guarantee in available phosphoric acid and valuation.

Of the superphosphates with potash, one brand in every eight fell below its guarantee in available phosphoric acid; nearly one in every three in potash, and nearly one in every two in either available phosphoric acid or potash, and one in every ten in valuation.

Of the so-called complete fertilizers, one in every twenty fell below its guarantee in available phosphoric acid, one in every nine in ammonia, one in every seven in potash, nearly one in every thirty something, and one in every sixty-two in valuation.

Or, if we take the average of the whole, it was found that one fertilizer out of every four fell below its guarantee in some ingredent—one in every six in potash, one in nine in ammonia, one in eleven in phosphoric acid, and one in fifteen in valuation.

GENERAL CONCLUSIONS.

(1) The number of brands registered for sale in North Carolina during 1897 is about the same as for 1896, but before that year the number increased very rapidly for each year since 1890, when there was a change from the brand tax to the tonnage tax.

(2) The consumption of commercial fertilizers has increased very rapidly each year amounting to about 208 thousand tons during 1897, valued at about five million dollars.

(3) The larger part of the fertilizers now used in the State are manufactured in North Carolina and Virginia.

(4) The average percentage composition of commercial fertilizers is about the same as for previous years in available phosphoric acid but there are slightly smaller percentages of ammonia and potash than for the two preceding years, probably because these are the more costly ingredients.

(5) One out of every four of the usual fertilizers fell below its guarantee in some single ingredient and one out of fifteen in its valuation.

(6) Except by the actual field trials of the fertilizers there is no method for determining the value of a commercial fertilizer but by chemical analysis, and but for the Fertilizer Control our farmers would be imposed upon by many worthless fertilizers.